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Accounting Students' Perceptions of a Learning Management System: An International Comparison

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ABSTRACT

The impact and use of technology on learning outcomes for accounting students is not well understood. This study investigated impact of design features of an 'off the shelf' Learning Management System (LMS)[1] in teaching undergraduate accounting students. Specifically, responses elicited from students located in the UK, Australia and New Zealand form the basis of the study which reports on a number of design features in the LMS (e.g. delivery of lecture notes, announcements, on-line assessment and model answers) used to deliver learning materials regarded as necessary to enhance learning outcomes. Responses from 825 on-campus students provided international data to develop a model to explain enhanced student motivation. The final model shows student satisfaction with the use of an LMS is associated with five variables: lecture notes availability, online assessment, announcements, model answers, and online chat.

Keywords: student perceptions, on-line learning, internet

[1] The term *Learning Management System* (LMS) is the generic classification for web-based software for the dissemination of course materials, learning and collaborative tools. Two of more popular commercial LMSs are WebCt and Blackboard, which were the LMSs used in this study. For a discussion of the relative merits of the alternative products available and their functionalities see Odvard, 2000. LMS is the preferred generic term used in this study, whereas others have used Virtual Learning Environment, Web-Based Learning Environment, or other similar labels (Seale and Mence, 2001).

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INTRODUCTION

The information age combined with quantum advances in information technology are revolutionising the way educators teach and students learn (Bryant and Hunton, 2000; Reeves, 1997). Universities around the world commit vast resources to the development of campus- or institutional-wide learning platform, either using one of the many off-the-shelf Learning Management Systems (LMSs) or functionally similar in-house systems. LMSs leverage on using the Internet for disseminating and communicating information to facilitating learning and delivery of courses (Seale and Mence, 2001).

An LMS is defined by ASTD (2006 p2), as "… software that automates the administration of training. The LMS registers users, tracks courses in a catalogue, records data from learners; and provides reports to management. An LMS is typically designed to handle courses by multiple publishers and providers. It usually does not include its own authoring capabilities; instead, it focuses on managing courses created by a variety of other sources." Typically, an LMS will offer learning tools such as lesson plans, course materials, discussion forum (or bulletin board), course assessments, chat rooms, and other tools (depending on actual software).

The 2006 LMS report (Bersin, 2006) value the overall LMS market is at approximately USD480 million, a 26 percent increase from its previous study in 2004. The report also noted that the growth in LMSs is driven by the availability of proven technology, continued growth in e-learning, and recognition that learning management systems do facilitate training effectiveness and efficiencies.

Educators involved in distance learning were seen as the early adopters of LMS as the Internet provided synergies for geographically separated student groups (Atkinson, Conboy, Atkinson,

Doods and McInnis, 1996; Liaw and Huang, 2000; Wade, 1999). Soon after, those involved in the more traditional face-to-face teaching in higher education saw the benefits of using an LMS as an information repository and communication hub to facilitate learning.

Many institutions and instructors have sung the accolades on the potential benefits an LMS offers, ranging from increased convenience, better cost-savings to enhanced learning experience, increased motivation, and improved learning outcomes. Butler and Mautz (1996), Kozma (1991) have challenged these findings citing Clark's (1983) *mere vehicles* argument, where the use of LMS is just another change in medium of delivery and as such unable to enhance learning under any conditions (Bryant and Hunton, 2000).

This diversity in opinion is encapsulated by Ramsey (2003) who noted that the impact and use of technology on learning outcomes for students and educators are not well understood. Further, according to Bryant and Hunton (2000), that this issue has not been well examined in the accounting literature provides the motivation for this study. Moving form the theoretical to the practical perspective and given that accounting educators around the globe have complimented their teaching with the use of LMSs, it seems imperative gauge the perceptions of students in relation to the changed instructional medium of the LMSs.

THE USE OF LMSs IN ACCOUNTING EDUCATION

There is overwhelming consensus from the accounting profession (American Accounting Association (AAA), 1985; 1989; Accounting Education Change Commission, 1990), academics (Biggs, 1999; Mayfield and Ali, 1996; Preston, 1992) and broader society (see, Senate Committee Report on Web-Based Education, 2000) that there is a need to incorporate new technologies into the classroom. Bonk and Smith (1998) suggest that this is necessary as it reflects the reality of the business world, benefiting students from a technical competency perspective. Boyce (1999) further asserts that the use of technology has the potential to change accounting education, by providing the opportunity for students to develop their range of "soft

skills", such as writing, communication and collaborative skills. There is no doubt that technology is changing the way we work, conduct business and go about our social discourse.

The combination of availability, accessibility and affordability of technology has certainly spurred the adoption of technology in education. Many educational institutions have adopted some form of learning platform, typically using one of LMSs that are available commercially in the market. Arbaugh and Duray (2002), O'Malley and McCraw (1999), Siragusa (2002) suggest that increased competition between education providers and increased expectations from various stakeholders, have put pressure on education providers to explore cost effective alternative methods for programme and course delivery. Indeed, some institutions are using their LMS primarily as a (cost-saving) delivery mechanism, whereas others have redesigned an entire course and pedagogy utilising the tools available within an LMS (Boyce, 1999).

Studies of motivation in the educational literature have resulted in models that suggest motivation and goal commitment are associated with enhanced learning outcomes (Kember, 1995; Tinto, 1993). Researchers who examined these relationships have noted student progress, is to some extent, explained by individual motivation for the task (Boulton-Lewis, 1995; Fransson, 1977; Keller, 1987). Motivation may be stimulated by the use of LMS as a result of improved access to learning materials, the provision of more timely feedback to students through on-line assessment (Breen, Cohen, and Chang, 2003), and improved communication among students and between students and faculty through the availability of bulletin boards, discussion forums and email facilities (Beard and Harper, 2002, Kang, 2001). In the process, Adler, Milne, and Stringer (2000), Booth, Luckett, and Mladenovic (1999) argue that such adoption of technology will facilitate deeper learning and enhance quality of learning outcome. Bryant and Hunton (2000), Kember (1995), Koh and Koh (1999), and Kozma (1991) also reported that improved learning outcomes result from heightened motivation and extended mental effort.

While the association between motivation, goal commitment and enhanced learning outcomes has intuitive appeal, the extant accounting research has not supported this association (Baldwin and Howe, 1982; Eskew and Faley; 1988; Gul and Fong, 1993). Koh and Koh (1999) have suggested that these inconclusive findings are more a product of methodological problems in

research designs than actual associations between variables.

As intuitive as it may be, researchers have inconclusive evidence on the pedagogical benefit of incorporating new technologies into the education process (Bonner, 1999; Brace-Govan and Clulow, 2000; Reeves, 1997; Smeaton and Keogh, 1999). This study contributes to the literature by providing rich data from three different geographically separated universities. Given this rich data it would be interesting to test whether change in pedagogy brought about by the introduction of a LMS in teaching accounting has any impact on student motivation. Further whether this change in motivation (if any) is the sole domain of any of the individual countries or a systematic response for any of the individual cohorts (i.e. Australia, New Zealand or United Kingdom).

RESEARCH SETTING

This study is differentiated from its predecessors as it concentrates on three distinct accounting student cohorts located in Australia (Aus), United Kingdom (UK) and New Zealand (NZ). All universities offer a generic business programmes with majors in accounting. The duration of each programme is three year full-time equivalent at the conclusion of which all those who successfully complete the accounting major are eligible to join a professional accounting body in their country[2].

Students located in Aus and UK were taking the Introductory Financial Accounting module in their respective countries. The objectives of the module is to illustrate to students how they can use the accounting information to prepare financial statements and as a basis for financial decision-making. The teaching delivery pattern of these introductory modules is based around large group lectures with small group tutorials, in the ratio of one tutorial to a two hour lecture

[2] Professional affiliation is generally accepted as a necessary pre-requisite for a career in accounting. Graduates form NZ are eligible to join the Institute of Chartered Accountants New Zealand (ICANZ) while graduates from the UK and AUS have similar professional organisations. It should be noted that some domestic professional bodies share reciprocal rights in other countries.

per week. These students have one assessment (test) contributing to their overall module mark, and one end of term examination. In NZ students were enrolled Accounting Information Systems and Auditing. This is a second year module which is mandatory for students seeking professional affiliation (ICANZ). Teaching is based on small group classes of up to 30 students for three hours per week in face-to-face mode.

At all three Universities administrators actively encourage and support the use of LMSs[3] to enhance learning by enabling students to obtain resources, facilitate increased interaction between students and with staff and to assist students in developing valuable information technology skills. As Blackboard and WebCT are off the shelf complete course management packages they include built-in tools such as: course documents, announcements, bulletin boards, chat, quizzes, etc. The agenda of the universities suggests that using Blackboard/WebCT would provide greater access to knowledge and enhance the students' learning experience. Since 2001, all learning materials relating to these modules have been delivered on-line via the internet, the only print materials being the final examination and textbook.

METHOD

In order to gauge student perceptions of learning benefits of using a LMS when teaching accounting, a survey was conducted among first year undergraduate students that were studying Accounting and who were exposed to a LMS. To facilitate an international comparison, the survey was conducted in three different countries, namely NZ, AUS and the U.K.

Survey Instrument

The questionnaire was originally developed by Suwardy and De Lange (1998) and subsequently modified and used by De Lange et al (2003) and Basioudis and De Lange (2006) to examine the

[3] In the UK and NZ Blackboard was used as the LMS while AUS students used WebCT.

use of IT as a change in pedagogy and a tool to improve student motivation and satisfaction in an AUS, NZ and a UK university.

Essentially the instrument seeks to measure student perceptions of the usefulness of the LMS in their accounting module. The instrument sought student responses in six areas: (1) Provision of lecture notes, (2) Bulletin Boards, (3) Self-Tests, i.e. self-grading quizzes that do not count towards final assessment, (4) use of other LMS Tools such as chat rooms, (5) overall evaluation of the LMS and (6) demographic information. Areas of investigation (1) to (5) were examined on the basis that these were the functional attributes of Blackboard/WebCT used as a LMS.

In sections one to five, several statements were posed to the students, e.g. "the availability of lecture notes online assisted my understanding of the module materials being presented" and "I prefer to do a formal test in a normal tutorial setting than doing an online quiz". In these sections (one to five) students indicated their preference on a five-point Likert scale anchored at 1 "*Strongly Agree*" to 5 "*Strongly Disagree*". In section six, revealed their demographics and were provided space at the end of the instrument for additional comments.

Procedure

The survey instrument was administered to all participants in their accounting module, during formally scheduled class times, toward the end of the semester. It was deemed appropriate to elicit responses toward the end of the module to ensure respondents were familiar with the LMS.

Improved learning outcomes can have a variety of meanings. For this study it is taken to mean academic grades or GPA achieved by students. Koh and Koh (1999), and Naser and Peel (1998) have used academic grades to measure improved learning outcomes.

Sample

The sample group for the study consisted of first-year accounting students from New Zealand, Australia and the United Kingdom. As one would anticipate of the 825 responses females amounted to 56 percent of the sample and the majority of the total number of respondents

were full-time students, this latter observation was confirmed by the age reported by respondents. The data are presented in Table 1.

[Insert Table 1 about here]

The factor analysis employed in this study resulted in a five-factor solution. A composite score was calculated for each of the elements identified by the factor analysis, by summing the scores of questions associated with each variable. These variables were usefulness of lecture notes, availability of lecture notes, the use of bulletin boards and discussion forums, and other LMS tools. The reliability of the measures for these variables was evaluated and found to be acceptable, with Cronbach alphas of 0.82, 0.79 and 0.71 respectively.

RESULTS

The results for the overall mean scores for each of the LMS composites, as well as the mean evaluation rating for the sample as a whole is shown in Table 2. Student responding to this survey report a relatively high level of satisfaction with their evaluation of the LMS project. On the scale of 1 to 5, where 1 is defined as “Strongly agree”, the mean score was 1.89. The four LMS composites also attracted positive responses. While all but one are closer to neutral than evaluation, the usefulness of lecture notes rated the highest with a mean score of 1.78, while availability of lecture notes rated the lowest with a mean of 3.11.

[Insert Table 2 about here]

Table 3 presents the results of the measures of association between the four LMS variables and students’ overall evaluation of the LMS project. While all variables are positive and significantly related to the level of students’ evaluation, usefulness of lecture notes with a score of 0.279 and the use of bulletin boards with a score of 0.183, appear to have a low positive correlation. Lecture notes availability, with a result of 0.089, and other LMS tools, with a 0.084 result, while positive, suggest a weak association between the reported level of students’ evaluation and lecture notes availability and other LMS tools.

[Insert Table 3 about here]

A multiple regression was also run to identify whether the four LMS variables are associated with the reported level of students' evaluation in a multivariate setting. The results, presented in Table 4, provide support for hypothesis that the four LMS variables (except from the lecture notes availability) are positively associated with the reported level of students' evaluation in a multivariate setting. The four LMS variables retain their significance after the additional demographic variables are introduced into the model. The models were inspected for mutlicollinearity problems by examining the Variance Inflation Factors (VIF). VIFs greater than 10 are indicative of severe mutlicollinearity problem, potentially inflating the estimated coefficients (Hair, Anderson, Tatham, & Black, 1998). Inspecting the VIFs does not indicate any problems with mutlicollinearity.

[Insert Table 4 about here]

When comparing the results of the UK study to the Australian study and to the New Zealand study, there appears to be little difference between the composite scores obtained in these studies. These comparisons are given in Table 5. The possible exception appears to be the usefulness of handouts. An inspection of the mean ranks for the students of the three countries (not reported) suggest that the UK students had the highest lecture notes usefulness scores, with the Australian cohort reporting the lowest. These small differences between the composite scores could be a reflection of cultural similarities between the three countries.

[Insert Table 5 about here]

DISCUSSION AND CONCLUSION

The aim of this study was to examine the relation between various design features of a LMS and students' overall evaluation, and whether differences exist across international and cultural boundaries. To examine differences across international and cultural boundaries, the study tested the LMS design aspects across three distinct student groups in three different countries.

Taken in totality findings presented here reflect and ideal where student interaction with the instructional medium (LMS) in three distinct countries is a significant factor that contributes to satisfaction. Of the five factors identified as contributing to increased motivation, two could be described as interactive, namely “online chat” and “online assessment” with the “provision of lecture notes”, and “provision of model answers” to tutorial questions being a one-way communication.

One could conclude from the statistical inferences of responses when aggregated that students support the faculties shift in pedagogy to a LMS. This observation is largely consistent with previous studies of student evaluations of a LMS (Suwardy and De Lange 1998,; De Lange et al 2003; Basioudis and De Lange 2006), where this survey reported a relatively high level of evaluation, with a composite mean of 1.89. While some could tempted to congratulate themselves on the decision to shift the pedagogy to a LMS platform, more sceptical observers could argue that practical necessity through changes in the expectation of students and broader society demanded a shift in pedagogy to LMS platform. If this is the reality those institutions that choose to ignore progress made in LMSs and technology more generally, do so at the risk of becoming marginalised in their student evaluations. Adding further credibility to this line of reasoning is that, the cross-cultural attitudes reported here indicate that there are similarities in the perceptions of students from the three countries examined (AUS, NZ and UK) towards the LMS design features.

Interestingly, this study goes some way in adding to the body of knowledge with regard to the generality of student perceptions about LMS platforms. Specifically, at one level faculty members and LMS developers should take some comfort with the findings that students from three discrete locations, institutions and courses reported similar perceptions with regard to a LMS. This finding alone should be of interest to educators and institutions as they try to come to terms with an increasingly diverse student mix. Diversity of course offering is further complicated in an institutional environment where directorates are under continued pressure to geographically diversify presumably seamless course offerings in ‘far flung’ locations under the guise of a new found profit centre.

For those interested in the export of education the holistic vision reported in this study suggests those design features most satisfying for these international cohorts are design features relating to usefulness of lecture notes, availability of lecture notes, the use of bulletin boards and discussion forums, and other LMS tools are universalistic and are positively related to students' evaluation.

Limitations and future research

The sample used in this study came from first year students studying for the Introduction to Accounting module in three different Business School from three different countries (Australia, New Zealand, United Kingdom). This may cause our results to be non-generalizable to other universities and institutions, although similar patterns are reported in this study for first year business students in three different countries. There have been few systematic studies in this area of educational research, and there is scope for researchers to investigate similar issues and capture the views of their students in other departments and modules.

In addition, there may be a scope of improving the empirical model's power by adding other potential factors to those identified in this study with the aim of providing a holistic representation of the factors that motivate students learning.

This is a cross-sectional study, and so subsequent regression models may (or may not) find the same association among factors. Further, researchers may attempt to do a longitudinal study whereas an underlying pattern may be observed over time among a number of influential factors.

REFERENCES

AAA (1985) Committee on Integrating the Computer into the Managerial / Cost Curriculum in Integrating the Computer into the Managerial / Cost Curriculum: A Resource Manual, American Accounting Association.

AAA (1989) Report of the Professorial Environment Committee, 1986-87 in Reorienting Accounting Education: Reports on the Environment, Professoriate, and Curriculum of Accounting, Schultz Jr., J.J. (eds), American Accounting Association, Accounting Education Series 10: 38.

Accounting Education Change Commission (1990) Objectives of education for accountants: position statement number one, *Issues in Accounting Education*, 5, 307-312.

Adler, R. W., Milne, M. J., and Stringer, C. P. (2000). Identifying and overcoming obstacles to learner-centred approaches in tertiary accounting edcuation: a field study and survey of accounting educators' perceptions. *Accounting Education*, *9*(2), 113-134.

Arbaugh, J. B., and Duray, R. (2002). Technological and Structural Characteristics, Student Learning and Satisfaction with Web-based Courses. *Management Learning*, *33*(3), 331-347.

ASTD (2006), "Learning Circuits Glossary", American Society for Training and Development, available at www.learningcircuits.com/glosarry.html, last accessed Jan 2006.

Atkinson, E., Conboy, I., Atkinson, J., Doods, A. and McInnis, C. (1996) Evaluation of the Open Learning Initiative: Tertiary, Access to Through a National Brokerage Agency, *Center for the Studies of Higher Education*, University of Melbourne, Melbourne, Australia.

Baldwin, B.A. and Howe, K.R. (1982) Secondary-level study of accounting and subsequent performance in the first college course, *The Accounting Review*, 57(3): 619-626.

Basioudis, I. G. and De Lange, P. (2006) An assessment of the learning benefits of using a web-based learning environment when teaching accounting, working paper, Aston Business School, UK

Beard, L. A., and Harper, C. (2002). Student Perceptions of Online Versus On Campus Instruction. *Education, 122*(4), 658-663.

Bersin, J. (2006), "Learning Management Systems 2006: Facts, Practical Analysis, Trends and Vendor Profiles", available from www.bersin.com, last accessed Jan 2006.

Biggs, J. B. (1999) *Teaching for quality learning at university*, The Society for Research into Higher Education and Open University Press, Milton Keynes, United Kingdom.

Bonk, C.J. and Smith, G.S. (1998), Alternative Instructional Strategies for Creative and Critical Thinking in the Accounting Curriculum, Journal of Accounting Education, 16(2): 261-293.

Bonner, S.E. (1999) Choosing teaching methods based on learning objectives: an integrative framework, *Issues in Accounting Education*, 14(1), 11-39.

Booth, P., Luckett, P., and Mladenovic, R. (1999). The quality of learning in accounting education: the impact of approaches to learning on academic performance. *Accounting Education, 8*(4), 277-300.

Boulton-Lewis, G.M. (1995) The SOLO Taxonomy as a Means of Shaping and Assessing Learning in Higher Education, Higher Education Research and Development, 14(2), 143-154.

Boyce, G. (1999). Computer-assisted teaching and learning in accounting: pedagogy or product?. *Journal of Accounting Education*, 17 (2/3), 191-220.

Brace-Govan, J., and Clulow, V. (2000). Varying expectations of online students and the implications for teachers: Findings from a journal study. *Distance Education, 21*(1), 118.

Breen, L., Cohen, L., and Chang, P. (2003). *Teaching and learning online for the first time: Student and coordinator perspectives.* Paper presented at the Partners in Learning: 12th Annual Teaching Learning Forum, Edith Cowan University, Perth.

Bryant, S.M. and Hunton, J.E. (2000) The Use of Technology in the Delivery of Instruction: Implications for Educators and Education Researchers, *Issues in Accounting Education*, 15(1): 129-162.

Butler, J. B. and Mautz, Jr. R.D. (1996) Multimedia Presentations and Learning: A Laboratory

Experiment, *Issues in Accounting Education*, 11(2): 259-280.

Clark, R. E. (1983) Reconsidering Research on Learning from Media, *Review of Educational Research*, 52(4): 445-459.

Eskew, D.M. and Faley, R.H. (1988) Some determinants of student performance in the first college-level financial accounting course, *The Accounting Review*, 63(1): 137-147.

Fransson, A. (1977) On qualitative differences in learning: IV. effects of intrinsic motivation and intrinsic test anxiety on process outcome, *British Journal of Educational Psychology*, 47: 244-57.

Gul, F. and Fong, S.C. (1993) Predicting success for introductory accounting students: some further Hong Kong evidence, *Accounting Education*, 2 (1): 61-67.

Kang, S. (2001). Toward a Collaborative Model for the Design of Web-Based Courses. *Educational Technology*, 41 (2), 22-30.

Keller, J.M. (1987) Strategies for stimulating the motivation to learn, *Performance and Instruction*, 26(8), 1-7.

Kember, D. (1995). *Open learning courses for adults: A model of student progress*. New Jersey: Englewood Cliffs: Educational Technololgy Publications.

Koh, Y.K. and Koh, C.K. (1999) The determinantes of performance in an accountancy degree programme, *Accounting Education*, 8(1), 13-29.

Kozma, R.B. (1991) Learning with media *Review of Educational Research*, (Summer), 179-211.

Liaw, S., and Huang, H. (2000). Enhancing interactivity in web-based instruction: A review of the literature. *Educational Technology*, 39 (3), 41-45.

Mayfield, J and Ali, K.S. (1996) The Internet as an Educational Tool, *19th International Conference on Computers and Industrial Engineering*, 31(1/2): 21-24.

O'Malley, J., and McCraw, H. (1999). Students Perceptions of Distance Learning, Online Learning and the Traditional Classroom. *Online Journal of Distance Learning Administration*.

Preston, N. (1992) Computers and teaching: A socially-critical review, *Journal of Computer*

Assisted Learning, 8, 49-56.

Ramsey, C. (2003). Using virtual learning environments to facilitate new learning relationships. *International Journal of Management Education*, 3 (2), 31-41.

Reeves, T. (1997) *Evaluating what really matters in computer-based education*, available at http://educationau.edu.au/archieves/cp/reeves.htm, 1-18.

Seale, J. and Mence, R.R. (2001) *An Introduction to Learning Technology within tertiary education in the UK*, Association for Learning Technology, Oxford Brookes University, Headington UK.

Siragusa, L. (2002). *Research into the effectiveness of online learning in higher education: Survey findings.* Paper presented at the 2002 West Australian Institute for Educational Research Forum, Edith Cowan University, Perth.

Smeaton, A., and Keogh, G. (1999). An analysis of the use of virtual delivery in undergraduate lectures. *Computers in Education, 32*, 83-94.

Tinto, V. (1993). *Leaving college: rethinking the causes and cures of student attrition*. The University of Chicago Press, 2nd Edition.

Wade, W. (1999). What Do Students Know and How Do We Know that They Know It?. *Technical Horizons in Education*, 27 (3), 94-97.

Table 1: Summary of Survey Results

	NZ	Australia	UK	Total
Gender of respondents:				
Female	118	174	167	459
Male	44	118	204	366
Mode of study:				
Full-time	124	272	365	761
Part-time	37	21	5	63
Age Group:				
less than 20	70	240	352	662
21-30	72	44	15	131
31-39	16	10	4	30
over 40	4	0	0	4

Table 2: Mean Descriptive Measures on Survey Items for Total Sample

Item	Mean Composite Measure	Number of Questions	Mean per Question
Lecture notes usefulness	4.4894	2	1.7786
Lecture notes availability	6.2104	2	3.1135
Bulletin board	7.7291	3	2.5901
Other LMS tools	7.0658	3	2.5255
Evaluation	5.6396	3	1.8894

Table 3: Measures of Association between LMS variables and Evaluation

Variables	Kendall's Correlation Coefficient (Kendall's Tau)	Level of Significance*
Lecture notes usefulness	0.279	0.000
Lecture notes availability	0.089	0.001
Bulletin board	0.183	0.000
Other LMS tools	0.084	0.002

* Correlation is significant at less than 5% level (2-tailed).

Table 4: Regression Analysis

	B	t	Sig. *	VIF
(Constant)	-1.675	-3.60	0.000	
Lecture notes usefulness	0.285	7.29	0.000	1.919
Lecture notes availability	-0.036	-0.88	0.379	1.568
Bulletin board	0.081	2.54	0.011	1.201
Other LMS tools	0.706	21.64	0.000	1.297
NZ	2.863	11.63	0.000	1.788
OZ	0.266	1.08	0.279	2.613
Adjusted R Square	0.446			
F	112.4183	(<0.0001)		

* Significance values are two-tailed.

Table 5: Differences in LMS variables and Evaluation between Students from New Zealand, Australia and the UK

	Mean Composite Measure			Kruskal-Wallis Test	
Variables	NZ	Australia	UK	Chi-square	p-value
Lecture notes usefulness	2.970	2.904	6.432	445.006	0.000
Lecture notes availability	6.283	4.535	7.525	310.609	0.000
Bulletin board	7.000	7.356	8.356	76.178	0.000
Other LMS tools	5.160	7.937	7.195	209.794	0.000
Evaluation	5.994	5.455	5.632	44.979	0.000